Table 5-1 (*Page 1 of 3*)
Chemicals of Concern for Different Product Releases

Contaminant		Gasoline	Diesel/ Light Fuel Oils	Product Jet Fuel	Kerosene	Heavy Fuel Oils	Waste/ Used Oil	Analytical Methods	
VOLATILES								**Groundwater**	**Soil**
Benzene	a	X	X	X	X	NC	X	8260B	8260B
Toluene	n	X	X	X	X	NC	X	8260B	8260B
Ethylbenzene	n	X	X	X	X	NC	X	8260B	8260B
Xylenes (total)	n	X	X	X	X	NC	X	8260B	8260B
1,2-Dibromoethane / Ethylene dibromide (EDB)	b	X[1]	NC	NC	NC	NC	NC	8011[6]	8260B/8260B-SIM[5]
1,2-Dichloroethane / Ethylene dichloride (EDC)	b	X[1]	NC	NC	NC	NC	NC	8260B/8260B-SIM[6]	8260B/8260B-SIM[5]
OXYGENATES									
Methyl-tert-butyl-ether (MTBE)	n	X	NC	NC	NC	NC	NC	8260B	8260B
Tertiary amyl methyl ether (TAME)		X	NC	NC	NC	NC	NC	8260B	8260B
Tertiary butyl alcohol (TBA)		X	NC	NC	NC	NC	NC	8260B	8260B
Ethyl-tert-butyl-ether (ETBE)		X	NC	NC	NC	NC	NC	8260B	8260B
Diisopropyl ether (DIPE)		X	NC	NC	NC	NC	NC	8260B	8260B
Ethanol		X	NC	NC	NC	NC	NC	Direct injection GC	NA
Methanol		X	NC	NC	NC	NC	NC	Direct injection GC	NA
TPH									
TPH-GRO		X	NC	NC	NC	NC	X	8260B	8260B
TPH-DRO		NC	X	X	X	X	X	8270C	8270C
TPH-ORO		NC	NC	X	X	X	X	8270C	8270C

Table 5-1 (*Page 2 of 3*)
Chemicals of Concern for Different Product Releases

Contaminant		Gasoline	Diesel/ Light Fuel Oils	Product Jet Fuel	Kerosene	Heavy Fuel Oils	Waste/ Used Oil	Analytical Methods	
PAHs[4]								**Groundwater**	**Soil**
Acenaphthene	n	NC	X	X	X	X	X	8270C[3]	8270C[3]
Anthracene	n	NC	X	X	X	X	X	8270C[3]	8270C[3]
Benzo(a)anthracene	b	NC	X	X	X	X	X	8270C[3]	8270C[3]
Benzo(a)pyrene	b	NC	X	X	X	X	X	8270C[3]	8270C[3]
Benzo(b)fluoranthene	b	NC	X	X	X	X	X	8270C[3]	8270C[3]
Benzo(k)fluoranthene	b	NC	X	X	X	X	X	8270C[3]	8270C[3]
Chrysene	b	NC	X	X	X	X	X	8270C[3]	8270C[3]
Dibenzo(a,h)anthracene	b	NC	X	X	X	X	X	8270C[3]	8270C[3]
Fluoranthene	n	NC	X	X	X	X	X	8270C[3]	8270C[3]
Fluorene	n	NC	X	X	X	X	X	8270C[3]	8270C[3]
Naphthalene	n	X	X	X	X	X	X	8260B[2], 8270C[3]	8260B[2], 8270C[3]
Pyrene	n	NC	X	X	X	X	X	8270C[3]	8270C[3]
METALS								**Soil and Groundwater**	
Arsenic		NC	NC	NC	NC	NC	X	6010B, 6020	
Barium		NC	NC	NC	NC	NC	X	6010B, 6020	
Cadmium		NC	NC	NC	NC	NC	X	6010B, 6020	
Chromium		NC	NC	NC	NC	NC	X	6010B, 6020	
Lead	b	X[1]	NC	NC	NC	NC	X	6010B, 6020	
Selenium		NC	NC	NC	NC	NC	X	6010B, 6020	

Table 5-1 (*Page 3 of 3*)
Chemicals of Concern for Different Product Releases

Note:
- X Chemical of concern to be analyzed
- NC Not a chemical of concern
- 1 Chemical of concern for leaded gasoline
- 2 When gasoline was the only product released, naphthalene should be analyzed by Method 8260B; if the petroleum released was other than or in addition to gasoline, naphthalene should be analyzed by Method 8270C
- 3 For 8270 where a detection limit lower than the Estimated Quantitation Limit is required, measures to increase the sensitivity of the method should be taken.
- a Human carcinogen (Group A under EPA weight of evidence classification system for carcinogenicity)
- b Probable human carcinogen (Group B1 or B2 under EPA weight of evidence classification system for carcinogenicity)
- n Non-carcinogen
- NA Not Applicable – soil samples need not be analyzed for ethanol or methanol
- 4 Samples must be analyzed for PAHs when TPH-DRO or TPH-ORO are detected in soil at a concentration at or above the RRLs in Table 5-3
- 5 When the product released was or could have been racing fuel, aviation gas, or leaded gasoline, soil samples must be analyzed for EDB and EDC. To determine whether leaded gasoline could have been released, MDNR will assume gasoline sold after December 31, 1986 was unleaded. In these cases, Method 8260B or Method 8260B-SIM (Selected Ion Monitoring) shall be used, unless another method having detection limits at or below applicable target levels is approved by MDNR.
- 6 When the product released was or could have been racing fuel, aviation gas, or leaded gasoline, and there is a complete exposure pathway for domestic use of groundwater, groundwater samples must be analyzed for EDB and EDC. To determine whether leaded gasoline could have been released, MDNR will assume gasoline sold after December 31, 1986 was unleaded. In these cases, Method 8011 shall be used to analyze for EDB and Method 8260B or Method 8260B-SIM (Selective Ion Monitoring) shall be used to analyze for EDC, unless other methods having detection limits at or below applicable target levels are approved by MDNR.

Sources:

- U. S. Environmental Protection Agency, November 1986, *Test Methods for Evaluating Solid Waste*, SW-846, Third Edition. Office of Solid Waste and Emergency Response, Washington D.C.
- U.S. Environmental Protection Agency, March 1983, *Methods for Chemical Analysis of Water and Wastes*, Environmental Monitoring and Support Laboratory, Cincinnati, OH 45263.
- Methods Information Communication Exchange, Office of Solid Waste, (703) 821-4690.
- U.S. Environmental Protection Agency, July 1982, *Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater*, EPA-600/4-82-057. Environmental Monitoring and Support Laboratory, Cincinnati, OH 45263.

Table 5-3
Required Reporting Limits

Listed below are the required reporting limits (RRLs) for the methods specified in the MRBCA guidance document. All listed RRL's should be viewed as conservative numbers and do not represent the absolute lowest quantitation levels achievable. Most laboratories should be able to obtain RRL's at or below the listed values.

VOLATILES

Compound	Method	Water PQL	Soil PQL
Benzene	8260B	5 µg/L	25 µg/Kg
Toluene	8260B	5 µg/L	25 µg/Kg
Ethylbenzene	8260B	5 µg/L	25 µg/Kg
Total Xylenes	8260B	10 µg/L	50 µg/Kg
Ethylene Dichloride (EDC)	8260B	5 µg/L	25 µg/Kg
Ethylene Dibromide (EDB)	8260B	5 µg/L	25 µg/Kg

OXYGENATES

Compound	Method	Water PQL	Soil PQL
MTBE	8260B	5 µg/L	25 µg/Kg
TAME	8260B	50 µg /L	250 µg/Kg
TBA	8260B	50 µg/L	250 µg/Kg
ETBE	8260B	5 µg/L	25 µg/Kg
DIPE	8260B	50 µg/L	250 µg/Kg
Ethanol (1)	8015	1 mg/L	(2)
Methanol (1)	8015	1 mg/L	(2)

TPH

Compound	Method	Water PQL	Soil PQL
TPH-GRO	8260B	1 mg/L	20 mg/Kg
TPH-DRO	8270C	1 mg/L	20 mg/Kg
TPH-ORO	8270C	1 mg/L	20 mg/Kg

PAH'S

Compound	Method	Water PQL	Soil PQL
Acenaphthene	8270C	10 µg/L	660 µg/Kg
Anthracene	8270C	10 µg/L	660 µg/Kg
Benzo(a)anthracene	8270C	10 µg/L	660 µg/Kg
Benzo(a)pyrene	8270C	10 µg/L	660 µg/Kg
Benzo(b)fluoranthene	8270C	10 µg/L	660 µg/Kg
Benzo(k)fluoranthene	8270C	10 µg/L	660 µg/Kg
Chrysene	8270C	10 µg/L	660 µg/Kg
Dibenzo(a,h)anthracene	8270C	10 µg/L	660 µg/Kg
Fluoranthene	8270C	10 µg/L	660 µg/Kg
Fluorene	8270C	10 µg/L	660 µg/Kg
Naphthalene	8270C	10 µg/L	660 µg/Kg
Pyrene	8270C	10 µg/L	660 µg/Kg

METALS

Metals	Method	Water PQL	Soil PQL
Arsenic	6010B	50 µg/L	2500 µg/Kg
Barium	6010B	5 µg/L	500 µg/Kg
Cadmium	6010B	5 µg/L	500 µg/Kg
Chromium	6010B	5 µg/L	500 µg/Kg
Lead	6020	5 µg/L	500 µg/Kg
Selenium	6010B	50 µg/L	2500 µg/Kg

(1) These compounds are to be analyzed by direct injection and not purge and trap.

(2) Soil samples will not be analyzed for Ethanol or Methanol.